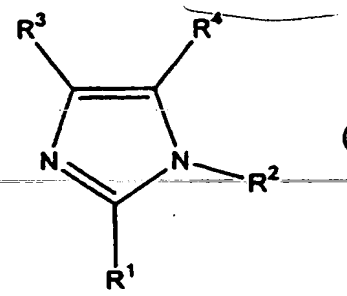
Claims

1. A method of therapeutically treating, prophylactically treating or ameliorating skin disease which comprises applying to portions of the disease of a patient an external preparation comprising a nitroimidazole derivative represented by the following formula (I), a pharmaceutically acceptable salt thereof, an ester thereof or other derivatives thereof as an active ingredient:



(I)

wherein R^1, R^3 and R^4 may be the same or different and each independently represents a hydrogen atom, a nitro group, a lower alkyl group, a lower alkyl group substituted by 1 or more substituents which may be the same or different selected from Substituent group α and Substituent group β, a lower alkenyl group, or a lower alkenyl group substituted by 1 or more substituents which may be the same or different selected from the Substituent group α and the Substituent group β; and R^2 represents a hydrogen atom, a lower alkyl group, a lower alkyl group substituted by 1 or more substituents which may be the same or different selected from the Substituent group α and the Substituent group β, a lower alkenyl group or a lower alkenyl group substituted by 1 or more substituents, which may be the same or different selected from the Substituent group α and the Substituent group β, provided that any one of R^1, R^3 and R^4 is a nitro group, wherein.
The Substituent group α comprises
a lower alkyloxy group, a lower alkyloxy group substituted by 1 or more substituents which may be the same or different selected from the Substituent group β, a lower

alkylcarbonyloxy group, a lower alkylcarbonyloxy group substituted by 1 or more substituents which may be the same or different selected from the Substituent group β, a lower alkylsulfonyl group, a lower alkylsulfonyl group substituted by 1 or more substituents which may be the same or different selected from the Substituent group β, a cycloalkyl group, a cycloalkyl group substituted by 1 or more substituents which may be the same or different selected from the Substituent group β, a heteroaryl group, a heteroaryl group substituted by 1 or more substituents which may be the same or different selected from the Substituent group β, an aryl group and an aryl group substituted by 1 or more substituents which may be the same or different selected from the Substituent group β; and

the Substituent group β comprises

a hydroxy group, a mercapto group, a halogen atom, an amino group, a lower alkylamino group, a lower alkyloxy group, a lower alkenyl group, a cyano group, a carboxy group, a carbamoyloxy group, a carboxyamide group, a thiocarboxyamide group and a morpholino group.

2. The method of claim 1, wherein R^4 is a nitro group.

3. The method of claim 2, wherein R^1 and R^2 are the same or different and represent a lower alkyl group, a lower alkyl group substituted by 1 or more substituents selected from the Substituent group α and the Substituent group β, a lower alkenyl group, or a lower alkenyl group substituted by 1 or more substituents which may be the same or different selected from the Substituent group α and the Substituent group β, and R^3 is a hydrogen atom.

4. The method of claim 3, wherein the Substituent group α is a lower alkyloxy group and the Substituent group β is a hydroxy group, an amino group, a halogen atom, a cycloalkyl group, a heteroaryl group or an aryl group.

5. The method of claim 4, wherein the Substituent group β is a hydroxy group, an amino group, a halogen atom or a heteroaryl group.

6. The method of claim 5, wherein R^1 is a lower alkyl group.

7. The method of claim 5, wherein R^2 is a lower alkyl group substituted by a hydroxy group.

8. The method of claim 1, wherein the preparation comprises 2-(2-methyl-5-nitroimidazole-1-yl)ethanol (general name: metronidazole), a pharmaceutically acceptable salt thereof, an ester thereof or other derivatives thereof as an active ingredient.

9. The method of claim 3, wherein the Substituent group α is a lower alkylsulfonyl group or a lower alkylsulfonyl group substituted by substituents which may be the same or different selected from the Substituent group β and the Substituent group β is a hydroxy group, a halogen atom, an amino group, a lower alkylamino group, a lower alkyloxy group, a lower alkenyl group, a cyano group, a carboxy group, a cycloalkyl group or an aryl group.

10. The method of claim 9, wherein R^1 is a lower alkyl group or lower alkyl group substituted by substituents which may be the same or different selected from the Substituent group β.

11. The method of claim 9, wherein R^2 is a lower alkylsulfonyl group or a lower alkylsulfonyl group substituted by substituents which may be the same or different selected from the Substituent group β.

12. The method of claim 1, wherein the preparation comprises 1-(2-ethylsulfonylethyl)-2-methyl-5-nitroimidazole (general name: tinidazole) or a pharmaceutically acceptable salt thereof as an active ingredient.

13. The method of claim 1 which comprises applying one compound of the nitroimidazole derivatives as defined in claim 1 and one medicine selected from the group consisting of an antimycotic agent, antibacterial agent, sulfa, immunosuppressant, antiinflammatory agent, antibiotic, antiviral agent, metabolic antagonist, antihistamine, tissue repair promoter, vitamin, antiallergic, local anesthetic, hair agent and steroid simultaneously or separately with an

interval to the portions.

14. The method of claim 13, wherein the antimycotic agent, the antibacterial agent, the sulfa, the immunosuppressant, the antiinflammatory agent, the antibiotic, the antiviral agent, the metabolic antagonist, the antihistamine, the tissue repair promoter, the vitamin, the antiallergic, the local anesthetic, the hair agent or the steroids is used with a concentration at which the agent itself does not demonstrate any pharmacological effect.

15. The method of claim 1 wherein the preparation further comprises crotamiton.

16. The method of claim 1 wherein the skin disease is atopic dermatitis.

17. The method of Claim 1, wherein the skin disease is facial atopic dermatitis.

18. The method of claim 1, wherein the skin disease is infant atopic dermatitis.

19. The method of claim 1, wherein the skin disease is blotches, pigmentation or scars of the skin.

20. The method of claim 1, wherein the skin disease is psoriasis.

21. The method of claim 1, wherein the skin disease is hircus, body odor or osmidrosis.

22. The method of claim 1, wherein the skin disease is contact dermatitis, plant dermatitis or insect bites.

23. The method of claim 1, wherein the skin disease is dermal pruritis or drug rash.

24. The method of claim 1, wherein the skin disease is chilblain.

25. The method of claim 1, wherein the skin disease is erythroderma.

26. The method of claim 1, wherein the skin disease is tinea.

27. The method of claim 1, wherein the skin disease is suppurative skin disease.

28. The method of claim 1, wherein the skin disease is pressure sore.

29. The method of claim 1, wherein the skin disease is wound.

30. The method of claim 1, wherein the skin disease is palmoplantar pustulosis, lichen planus, lichen nitidus, pityriasis rubra pilaris, pityriasis rosea, erythema (including polymorphic exudative erythema, erythema nodosum and Darier's erythema annulare centrifugum), discoid lupus erythematosus, drug rash and toxic rash, alopecia areata, burns (including scars and keloids), pemphigus, Duhring dermatitis herpetiformus (including pemphigoid), seborrheic dermatitis, dermal stomatitis, Candidiasis (including interdigital erosion, intertrigo, dermal Candidiasis, infantile parasitic erythema, perionychia and vaginal Candidiasis) or tinea versicolor.

31. The method of claim 1 wherein a concentration of the nitroimidazole derivative is 0.1 to 20 % by weight based on the amount of the preparation.